CLAIMS

What is claimed is:

1. A method for producing a plurality of zig-zag slabs, said method comprising:

a) providing two non-active media and an active medium;

b) bonding said two non-active media at two opposite faces of said active medium thereby producing a slab sandwich having coupling faces on said non-active media, a length defined between said coupling faces, a width and a thickness;

c) dicing said slab sandwich substantially perpendicular to said thickness to produce slab slices;

d) rendering two total-internal-reflection (TIR) surfaces of said slab slices from two parallel surfaces coextensive with said length of said slab sandwich;

e) dicing said slab slices substantially perpendicular to said two TIR surfaces and substantially along said length to produce said plurality of zig-zag slabs.

2. The method of claim 1, wherein said bonding comprises a method selected from the group consisting of diffusion bonding, silicate bonding, and frit bonding.

3. The method of claim 1, wherein said rendering comprises polishing of at least one of said two parallel surfaces.

4. The method of claim 3, wherein said dicing of said slab sandwich and said polishing are performed such that said thickness of said slab slice defined

between said two parallel surfaces is in a range between 0.01 and 20 mm.

5. The method of claim 1, wherein said rendering comprises providing a coating on at least one of said two parallel surfaces.

6. The method of claim 5, wherein said coating provides total internal reflection for laser light traveling along a zig-zag optical path within one of said plurality of zig-zag slabs.

7. The method of claim 5, wherein said coating provides reflectivity less than 1% for light at a laser wavelength and incident on said TIR surface from within said zig-zag slab at an angle of incidence less than about 0.9 times the TIR critical angle.

8. The method of claim 5, wherein said coating provides reflectivity less than 1% for light at a pump wavelength and incident on said TIR surface from outside said zig-zag slab at an angle of incidence less than about 45 degrees.

9. The method of claim 1, further comprising processing said coupling faces.

10. The method of claim 9, wherein said processing of said coupling faces comprises polishing.

11. The method of claim 9, wherein said processing of said coupling faces comprises coating.

12. The method of claim 9, wherein said processing of said coupling faces comprises cutting and polishing to predetermined angles.

13. The method of claim 1, further comprising treating at least one side wall of said zig-zag slabs.

14. The method of claim 13, wherein said treating comprises roughening of said at least one side wall.

15. The method of claim 14, wherein said roughening is performed to produce a predetermined forward scatter of pump light in said zig-zag slab.

16. The method of claim 13, wherein said treating comprises polishing of said at least one side wall.